

New York State Department of
Public Service
Office of Electric, Gas, & Water
Pipeline Safety Section

**OPERATOR QUALIFICATION
WHITE PAPER**



Origins

The origin of OQ can be traced back to a December 1982 Federal Department of Transportation (DOT) Inspector General (IG) recommendation that a licensing and certification requirement be adopted for natural gas distribution operations. DOT's intent was to reduce the risk of accidents on pipeline facilities attributable to human error.



Cause for the paper

A recent review of specific covered tasks completed by both operator and contractor personnel in New York State has cast doubt on the efficacy of current OQ programs, thus, prompting a wholesale review of implementation of the OQ rule, including operator programs and practices.



Findings and Events

The need for this White Paper arose out of a series of recent events and New York Department of Public Service Staff (DPS or Staff) findings of substandard operator performance of covered tasks

Workers were not properly qualified, were evaluated using only written tests (some of which were severely compromised, as described below), or whose work on covered tasks actually increased the risk and probability of accidents and incidents.



Incidents

The recent incident in the Merrimack Valley of Massachusetts is a pertinent example. The incident resulted in an over-pressurization of the low-pressure distribution system, one fatality, at least 21 injuries requiring medical attention, and significant property damage to over 130 structures.



Potential Cause

Therefore, it is imperative to address overall OQ program standards - specifically, “off the shelf” OQ programs that have focused almost exclusively on knowledge-based written evaluations, with little or no assessment of individual skills and ability. *For instance, today’s standardized programs include virtually no focus on actual equipment or procedures used within each individual operator’s pipeline system(s).* (emphasis mine)



Off-the Shelf

By employing “off-the-shelf” programs with little modification to prepare workers for each operator’s individual system, New York State operators have essentially transferred the responsibility for qualifying individuals such as contractor personnel working on their systems to a third-party vendor using that vendor’s generic program. The OQ rule does not transfer regulatory accountability nor the responsibility for ensuring safe operation of the pipeline system to contractor personnel; likewise, no operator’s OQ program should transfer these responsibilities to unaccountable third-party OQ program-providers.



Findings

This inadequate operator oversight and lack of accountability over OQ processes and practices have led to multiple allegations of cheating on written examinations by contractors attempting to become qualified under an “off-the-shelf” program used by New York operators. With respect to two contracting companies, these allegations were confirmed and required a complete overhaul of all written examinations used for the qualification process. As a result, the qualifications of both the individuals alleged to have had access to compromised tests and, later, those of anyone deemed “qualified” by having taken the standardized written examinations in question were invalidated.



Investigations

Furthermore, post-construction verification excavations performed by multiple operators on both distribution and transmission facilities revealed numerous deficiencies that called into question the competency of both the persons completing the covered tasks and the inspectors overseeing these projects, as well as the overall operator oversight and management of the projects. These “re-digs” on distribution lines identified multiple plastic fuses where qualified employees either failed to recognize a visually unacceptable plastic fuse or allowed the visually unacceptable fuses to be installed and energized.



State Action

The failure of the federal DOT Pipeline and Hazardous Materials Safety Administration (PHMSA) to adopt regulatory changes to the operator qualification requirements proposed in 2015, which would have addressed these and other OQ program deficiencies, further illustrates the need for state action.

Accordingly, New York should take steps to ensure that the qualifications of pipeline personnel working within the state include adequate training and effective evaluation using *specific operator procedures and equipment*. Staff supports PHMSA's proposed changes, which reflected the clear need for a more prescriptive OQ rule and requirements for annual evaluation of overall OQ program effectiveness.



State Action

While it is important that operators evaluate the best practices presented and either adopt each or provide reasonable justification for excluding them, the intent of this White Paper is to provide a blueprint *for operators to reclaim full responsibility and ownership of the OQ process.*



Proposed processes

OQ, therefore, must be a four-part process where basic knowledge is:

- (1) presented
- (2) evaluated by either the operator or a third-party,
- (3) followed by specific training for skills and abilities,
- (4) followed by the evaluation (by the operator) of the performance of each covered task to establish qualification(s) to perform specific covered tasks for the operator.



Possible Root of the Problem

Outsourcing of OQ from a perspective of safety, integrity management, and regulatory compliance became and remains **problematic**. The operator ultimately is responsible for compliance, not any third-party vendor or any contractor. While contractual clauses may shift civil and financial liabilities to the contractor (thereby attempting to protect ratepayers), the regulatory liability associated with the requirement that covered tasks only be performed by properly operator qualified personnel remains with the operator.



New York State Specific Concerns

The existing evaluation protocols in New York State do not directly test for operator-specific practices, such as each operator's operations and maintenance procedures or the specific equipment in each operator's system or used by the operator to conduct surveys/inspections. Control over the OQ program and testing most operators use is held by the third-party vendors, thereby giving operators minimal control over questions that appear in written examinations for covered tasks.



Example of How it Should be Done for a CT

The joining requirements in 16 NYCRR Part 255, specifically for plastic pipe, detail that rigor. First, the procedure to join plastic pipe must be qualified (i.e., the procedure to be used must be shown to repeatedly produce fuses that are sound). Then an individual must be qualified to make fuses using that qualified procedure. **In this example, qualification is only earned by both training and/or experience in the use of the qualified procedure, and through the demonstration of one's performance using that qualified procedure.** This is followed by the examination of a specimen joint (a practical exam) that must pass both visual inspection and at least one of multiple, approved, destructive and/or nondestructive testing methods.



Specific Concerns con't

Operators regularly hire contractor personnel under the assumption that they are qualified solely because they have completed the knowledge-based written examination. Operators, however, investigate very little, if at all, to ensure that the contractors on-site possess the skills and abilities to complete the covered tasks for which they are hired to properly perform.

It bears repeating that written evaluation alone cannot effectively measure skills and abilities.



Primary Findings

- (1) OQ plans were not in the control of the operator;
- (2) OQ plans are inconsistent with each operator's actual Operations and Maintenance Plans and Emergency Response procedures;
- (3) OQ plans provide insufficient information on how a "covered task" is identified as such;
- (4) OQ plans do not explain how persons qualifying others, were themselves qualified, and how re-evaluation intervals are established;
- (5) The plans lack sufficient documentation that any meaningful criteria were considered to determine which portions of covered tasks should be considered critical to correct performance;



- (6) Plans lack any apparent expectation that questions relating to critical tasks had to be answered correctly during written evaluations;
- (7) AOCs specific to individual covered tasks were not clearly compared to specific covered tasks;
- (8) Successfully answering **all** AOC-related questions was not a condition for qualification;
- (9) Span of control, meaning the OQ program's allowed number of not properly qualified persons being directed and observed by a qualified person, often seemed unreasonable and unsafe;
- (10) Security of evaluation materials throughout the test-taking process was severely lacking.



Examples of Errors Observed

1. operating a main line valve instead of a service curb valve;
2. bar holing directly over a marked out electrical service;
3. pulling water through a gas sensor and continuing to use the sensor;
4. ringing doorbells during a leak investigation;
5. installing plastic pipe with no tracer wire;
6. inadequately testing service lines; and
7. misclassifying leaks



Conclusion

The key element missing in current OQ plans is operator control. Each operator must regain sufficient control over the execution of its OQ plan to ensure the capacity of its workforce to perform covered tasks on its facilities in a manner that ensures public safety and compliance with the regulations. At all times, the operator must know that work done on its facilities is being performed by an operator-qualified individual, or under the observation of an operator-qualified individual, who can correctly complete the covered task and recognize and react to AOCs that may be encountered while performing that task.



Model Plan

The “four-part test” shall be eliminated and replaced by a “two-part test.” Simply put, every task performed on a pipeline facility that affect(s) the integrity of the pipeline shall be considered a “covered task” and shall require operator qualification credentials.

Training and evaluation must be sufficient to ensure that any individual working on a pipeline has the knowledge, skills, and abilities to perform a given covered task using specific operator procedures and equipment, as well as being able to recognize and react to any Abnormal Operating Conditions.



Model Process

1. Operators shall provide individuals training that provides the knowledge required to perform a covered task, using operator and ***facility-specific procedures*** and equipment. This may, for instance, take the form of in-classroom, web-based lectures, or written documents. Such training will also include a process that teaches workers how to identify and react to ***facility-specific AOCs***. In all cases, the training completed shall be reviewed and documented by the operator.



Model Process

2. Operators shall evaluate the individual's knowledge through a documented written or oral examination.
3. Operators shall further develop an individual's knowledge, skills, and abilities through on-the-job training. This shall include hands-on learning, simulations, etc.
 - a. Hands-on training must be specifically tailored to each operator's procedures and equipment.
 - b. Any training on live pipeline facilities must be directed and observed by OQ qualified personnel and fall within designated and conservative span of control limits defined for that covered task.



Model Process

4. Operators shall evaluate the individuals' skills and abilities through a documented practical evaluation.
 - a. Practical evaluation must be accomplished through on-the-job performance (using company procedures and equipment) of a covered task while being directed and observed by OQ qualified personnel and must fall within designated span of control limits defined for that covered task.
 - b. Operators must evaluate whether an individual can recognize and react to AOCs during a practical evaluation. Under no circumstance may a not fully qualified individual perform covered tasks involving critical functions (pressure regulation, etc.), even if directed and observed by a qualified individual.



Model Process

5. Operators must establish requalification intervals for each covered task. Requalification is intended to ensure that individuals are correctly performing covered tasks according to company procedures. Requalification must include both training and evaluation (using operator procedures and equipment) similar to the process for an individual's initial qualification to verify they still possess the required KSA to properly complete a covered task.



Model Process

6. A “Management of Change” program must be an established and documented whereby the operator identifies any significant changes (including, for instance, changes in procedures or equipment) that may affect individuals’ qualification(s) and communicates those changes to everyone affected by the change. The program must clearly define what constitutes a significant change (e.g. which procedures or equipment), how these changes are communicated, and whether a “stand-down” or “transition” period is necessary. For instance, significant changes (a) that the operator identifies would negatively impact the pipeline facilities if currently qualified individuals perform the related covered task(s) may require a “stand-down” period.



Model Process

(6 Cont'd) In this instance, all individuals' qualifications to perform the specific task(s) may be rescinded. This is intended to ensure individuals do not perform a covered task until properly re-qualified with the change(s). Alternatively, a significant change (b) that the operator identifies would not negatively impact the pipeline facilities if currently qualified individuals perform related covered task(s) may require a "transition" period in which a determined interval is set during which the covered task may still be performed by currently qualified individuals but re-qualification is still necessary going forward. This is intended to allow operators to continue normal operations with currently qualified individuals while integrating the changes over a period of time.



Model Process

7. The standards and expectations for operator qualification of contractors and operator employees are the same. Ideally, contractors shall use the same equipment and procedures as operator employees. In the rare exception when a contractor with specialized skills uses different equipment and/or procedures than the operator, the contractor's OQ training procedures should reflect and address any differences from the operator's procedures and equipment. Nonetheless, the specialized contractor's equipment and procedures must also meet the operator's standard requirements included in the operator's equipment qualification and operator procedure qualification. The review and the acceptance of these procedures and equipment by the operator must be documented.



Model Process

8. Records shall be kept on each individual qualified, how qualification was determined, and who made the final determination. Records must be maintained concerning any instances where non-qualified individuals performed work on the pipeline while being directed and observed by a qualified individual. This documentation process can be used to document on-the-job training. Such records must be easily accessible by NYSDPS Staff performing audits of covered tasks.



Model Process

9. When using Mutual Aid (MA) for emergency response, etc., operators must review and retain records of the all individual(s) intending to perform covered tasks and the individuals intending to direct and observe any non-qualified individual(s) performing each covered task. These individuals would need to be qualified under the plan of the operator seeking MA or that operator must review the program(s) the MA was qualified under and document that it meets or exceeds the requesting operator's plan. Span of control limitations must be maintained.



Model Process

10. Identification of the covered tasks that an individual is qualified to perform, and the expiration date of that qualification, shall be readily accessible and easily verified by the individual, the supervisor, the operator, and the regulatory inspector. It is essential that operators, contractors, and regulatory staff be able to verify that the person performing the covered task is qualified or the person directing and observing that individual is qualified. *While the OQ rule allows contractors to 'qualify' individuals performing covered tasks, operators must review each contractor's program and be sure that it meets (or exceeds) the operator's OQ plan.* This review must be documented.



Model Process

11. Finally, the written qualification program shall include a training and evaluation process for personnel performing engineering tasks so that functions such as the development of design and engineering modifications to the pipeline system are performed and/or reviewed by qualified personnel.



Best Practices

1. No person shall perform a covered task on a pipeline system unless they are properly qualified. Qualified as it applies to an individual performing a covered task, means that an individual has been evaluated and can:
 - a. Perform assigned covered tasks.
 - b. Recognize and react to abnormal operating conditions that may be encountered while performing a covered task.
 - c. Demonstrate technical knowledge required to perform the covered task, such as: equipment selection, maintenance of equipment, calibration and proper operation of equipment, including variations that may be encountered in the covered task performance due to equipment and environmental differences.
 - d. Demonstrate the technical skills required to perform the covered task, for example:
 - i. Variations required in the covered task performance due to equipment and/or new operations differences or changes;



Best Practices cont'd

- ii. Variations required in covered task performance due to conditions or context differences (e.g., hot work versus work on evacuated pipeline)
- e. Meet the physical abilities required to perform the specific covered task (e.g., color vision or hearing).



Testing, Training, Evaluation

1. Operators shall provide training to ensure that any individual performing a covered task has the necessary knowledge, skills, and abilities to perform the task in a manner that ensures the safety and integrity of the operator's pipeline facilities.
2. The training of all persons qualified under the OQ Plan shall be verified and documented.
3. Contractors must receive the same training as operator personnel.
4. Training on the operator's procedures and equipment must be included in the OQ Plan. This training must be completed prior to evaluation and the evaluation must include operator procedures and equipment.



Testing, Training, Evaluation

5. Specific triggers for additional training must be clearly defined (training required after failed evaluations, unacceptable performance, etc.). This training must be completed prior to re-evaluation.
6. Additional training shall be required if an individual does not pass any evaluation (written or practical).
7. In no case shall an untrained individual perform covered tasks involving critical functions (pressure regulation, etc.), even if directed and observed by a qualified individual.
8. The operator shall provide supplemental training for the individual when procedures and specifications are changed for the covered task.



Written Evaluation

1. Each evaluation for a covered task must determine whether the individual can perform the assigned covered task correctly and recognize and react to abnormal operating conditions. Each evaluation must include a written (or oral) examination and a practical evaluation (observation during performance on the job or during simulation(s)).
2. Evaluation methods and results must be documented for each covered task for each qualified person. Pass/Fail results alone are not acceptable.
3. Deficiencies/recommendations from effectiveness evaluations shall be incorporated into the plan as soon as practical. The OQ Plan shall clearly define this timeframe.



Written Evaluation

4. The Plan shall include provisions to evaluate an individual if there is reason to believe the individual is no longer qualified to perform a covered task. This will be based on covered task performance contributing to an incident or accident and other factors affecting the proper performance/completion of covered tasks. These other factors shall include observation of a task being improperly completed or documentation of incorrect task completion (record illustrates improper completion).
5. Re-assessment and re-qualification intervals for each covered task shall be clearly documented and supported.



Written Evaluation

6. The Plan must include a documented process for ensuring that only operator qualified individuals, or individuals being directed and observed by operator qualified individuals, are performing covered tasks. If span of control is greater than 1:1 for any covered task, the plan must include documented justification (e.g., a review of OQ for each job location, a qualified inspector is assigned for each working location).

7. The Plan must capture all qualifications of an individual in one uniform, easily accessible system that allows for near-instantaneous verification of qualifications in the field at any time.



Written Evaluation

8. Evaluation (written or practical) shall not occur until after a minimum established timeframe once training has been completed. For example, if training is given on one day, the Plan must state that evaluation cannot occur for XX days after the training is completed. This period of time shall be documented and justified and cannot be less than 48 hours after training is completed.

9. Re-evaluation (written or practical) shall not occur until after a minimum established timeframe following any failed evaluation for the same covered task.



Written Evaluation

10. Qualification shall not be determined by written evaluations alone.
11. Evaluation intervals for covered tasks involving critical functions (pressure regulation, etc.) shall occur at least annually. If, during the evaluation, any step is not performed properly, or any critical question is not answered properly, evaluation shall immediately stop, and the person(s) shall be retrained and re-evaluated at a later date and shall not attempt to complete the task until retrained.
12. Unless impractical because of function, practical evaluations shall not exceed one-on-one (one person evaluated at a time).



Written Evaluation

13. Observation of on-the-job performance shall not be used as a sole method of evaluation. However, when on-the-job performance is used to complete an individual's competency for a covered task, the operator qualification procedure must define the measures used to determine successful completion of the on-the-job performance evaluation.
14. The operator shall establish the requirements to be an Evaluator, including the necessary training.
15. A training and evaluation process for personnel performing engineering tasks shall be added to the OQ program so that functions such as the development of design and engineering modifications to the pipeline system are performed and reviewed by qualified personnel.



Written Evaluation

16. Reasonable accommodations shall be offered to persons that have trouble taking written evaluations. These accommodations shall include offering an option to use oral examination and upon request to do so.

17. All non-written evaluations shall be videotaped with full video and audio capabilities functioning and shall be maintained while the individual is performing the covered task. Records of prior qualification and records of individuals no longer performing covered tasks shall be retained for a period of five years.



Practical Evaluations

1. Practical evaluation (observation during performance on the job or simulation) is required for all covered tasks. If there is a covered task that cannot be evaluated using practical evaluation, the plan must clearly identify the task(s) and the reasons why practical evaluation is not feasible.
2. Practical evaluations shall be administered on a one-to-one basis (one evaluator and one person being evaluated) unless the specific covered task cannot be completed by only one person.
3. If an OQ Plan from another entity/contractor is accepted by the operator, the review and acceptance must be clearly documented (e.g., who approved the plan, when it was approved, etc.) to demonstrate that it meets or exceeds the requirements of the operator's OQ Plan and conforms to the procedures and equipment used by the operator.



Practical Evaluations

4. The operator would develop and document a matrix that cross references the operator's OQ task list with the task list in each Contractor's OQ plan. If the operator identifies any gaps between the two plans, the operator must address and rectify the differences prior to performing any covered task. For example, under specific circumstances, Operator XYZ requires that three covered tasks be performed: #20A (investigating inside leaks), #20B (investigating outside leaks), and #20C (classifying leaks), while the Contractor only requires covered task #20 (leak investigation). Prior to any work being performed, clear documentation should exist explaining either that the contractor's task #20 is equivalent to the operator's task #20A, #20B, and #20C, and why the operator has 3 covered tasks, when the contractor has only one; the differences should be rectified.



Practical Evaluations

5. Operators must have a written and practical evaluation method to assess any contractor individual who is qualified under another accepted OQ Plan to evaluate and demonstrate knowledge, skill, and ability to perform covered tasks with the given operator (operator procedures and equipment).
6. Evaluations shall not be “group evaluations.” The objective is to determine the competency of the individual, not the group.



Practical Evaluations

7. Guidance shall not be given during the evaluation. Operator procedures can be referenced by the person being evaluated. However, no other documents shall be allowed.
8. Any oral examination questions given during practical evaluations shall be documented, along with the answers given.



Program Effectiveness

1. The qualification program must include a written process to measure the program's effectiveness. An effective program minimizes human error caused by an individual's KSAs to perform covered tasks. An operator must conduct the program effectiveness review once each calendar year not to exceed 15 months.
2. The process to measure program effectiveness must (1) evaluate if the qualification program is being implemented and executed as written; and (2) establish provisions to amend the program to include any changes necessary to address the findings of the program effectiveness review.
3. The operator must develop program measures to determine the effectiveness of the qualification program. The operator must, at a minimum, include and use the following measures to evaluate the effectiveness of the program:



Program Effectiveness

- a. Keep a record of the number of occurrences caused by any individual whose performance of a covered task(s) adversely affected the safety or integrity of the pipeline due to any of the following deficiencies:
 - i. Evaluation was not conducted properly;
 - ii. KSAs for the specific covered task(s) were not adequately determined;
 - iii. Training was not adequate for the specific covered task(s);
 - iv. Change made to a covered task or the KSAs was not adequately evaluated for necessary changes to training or evaluation;



Program Effectiveness

- v. Change to a covered task(s) or the KSAs was not adequately communicated;
- vi. Individual failed to recognize an abnormal operating condition, whether it is task-specific or non-task-specific, which occurs anywhere on the system;
- vii. Individual failed to take the appropriate action following the recognition of an abnormal operating condition (task-specific or non-task-specific) that occurs anywhere on the system;
- viii. Individual was not qualified;
- ix. Nonqualified individual was not being directed and observed by a qualified individual;



Program Effectiveness

- x. Individual did not follow approved procedures and/or use approved equipment;
- xi. Span of control was not followed;
- xii. Evaluator or training did not follow program or meet requirements; or
- xiii. The qualified individual supervised more than one covered task at the time.



Questions? Discussion?

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